*Engineered for flexibility and performance.™*

CMWV - 2004

# Vertical Water Source Heat Pump And Cooling Only Unit

Models: MWV 015 A/AR MWV 030 A/AR
MWV 020 A/AR MWV 040 A/AR
MWV 025 A/AR MWV 050 A/AR

McQuay®
Air Conditioning

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**Note**: Installation and maintenance are to be performed only by qualified personnel who are familiar with local codes and regulations, and experienced with this type of equipment,

**Caution:** Sharp edges and coil surfaces are a potential injury hazard. Avoid contact with them.

**Warning:** Moving machinery and electrical power hazards. May cause severe personal injury or death. Disconnect and lock off power before servicing equipment.


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# Features

## High Energy efficiency

The unit has high efficiency as the high energy/effect ratio and a Max. COP of 4.2 as well as saving the running cost due to water as cooling and heating media.

## Whisper- Quiet Operation

Solid casing, special sound absorbing and thermal insulation material, separated fan and compressor as well as the special noise reduction for compressor ensure an effective noise control for the whole set.

## Easy and flexible installation

The physical size of the unit is specially designed for space saving. It is therefore offering greatest flexibility in selecting installation location.

## Service and Maintenance Friendly

The unique structure design: small and compact structure with many overhaul doors and high/low pressure overhaul valve which helps overhauling and maintenance.
Also, Tube in tube heater exchanger specially designed for water loop heat pump set which reduces pipe block and ensures a longer use life and a higher thermal conductivity.

## Microcomputer Remote Control

**The microcomputer remote control has following functions:**
Five optional operation modes (heat/cool/dry/fan/auto)
Fan speed can be set at high, medium, low and automatic.
Sleep mode automatically increase set temperature since temperature is lower at night thus achieving healthy sleep.

Microcomputer controlled thermostat precisely controls room temperature resulting in energy saving and increases comfort.
Hot start and hot keep mode do not supply air for 30 sec. After deicing as well as initial operation of heating mode. This prevents cold draft and maintains the indoor comfort.
Timer on/off can be preset for the maximum of 15 hours.

## A wide Operating Scope

All products of AWV series have adopted air compressors with world famous brands.
The operating scopes are:

Water temperature: (a) Cooling 13-40 ℃ (b) Heating: 10-32 ℃

This series of types are applicable for residential, shopping complex, hotels and industries.

# Specifications

| MODEL | | | MWV015A | MWV015AR | MWV020A | MWV020AR | MWV025A | MWV025AR |
|---|---|---|---|---|---|---|---|---|
| COOLING CAPACITY | | Btu/h | 14330 | | 19110 | | 23890 | |
| HEATING CAPACITY | | Btu/h | - | 15360 | - | 20478 | - | 25600 |
| POWER INPUT | COOLING | W | 4200 | | 5600 | | 7000 | |
| | HEATING | W | - | 4500 | - | 6000 | - | 7500 |
| POWER SOURCE | | V/Ph/Hz | 220 - 240 / 1 / 50 | | 220 - 240 / 1 / 50 | | 220 - 240 / 1 / 50 | |
| EER | | | 4.2 | | 3.5 | | 3.9 | |
| COP | | | - | 4 | - | 3.5 | - | 3.85 |
| ROW / FIN PER INCH | | | 3 / 14 | | 3 / 14 | | 3 / 12 | |
| FACE AREA | | $m^2$ | 0.183 | | 0.183 | | 0.267 | |
| FAN | POWER INPUT | W | 103 | | 215 | | 191 | |
| | Depth | mm | 178 | | 178 | | 254 | |
| | Width | mm | 178 | | 178 | | 203 | |
| AIR FLOW | | CFM | 440 | | 600 | | 740 | |
| | | L/s | 208 | | 283 | | 347 | |
| WATER FLOW | | GPM | 3.48 | | 4.44 | | 5.7 | |
| | | L/s | 0.222 | | 0.305 | | 0.361 | |
| WATER PRESSURE DROP | | $mH_2O$ | 1.3 | | 1.5 | | 1.7 | |
| WATER CONNECTIONS | | FPT | 3/4 | | | | | |
| CONNECTIONS | I.D. | mm | 19.05 | | | | | |
| WEIGHT | OPERATING | kg | 93 | | 95 | | 115 | |
| | SHIPPING | kg | - | | - | | 150 | |

**Rated in accordance with ANSI/ARI Standard 320-1998**

| MODEL | | | MWV030A | MWV030AR | MWV040A | MWV040AR | MWV050A | MWV050AR |
|---|---|---|---|---|---|---|---|---|
| COOLING CAPACITY | | Btu/h | 30720 | | 37540 | | 47780 | |
| HEATING CAPACITY | | Btu/h | - | 34130 | - | 42660 | - | 52900 |
| POWER INPUT | COOLING | W | 9000 | | 11000 | | 14000 | |
| | HEATING | W | - | 10000 | - | 12500 | - | 15500 |
| POWER SOURCE | | V/Ph/Hz | 220 - 240 / 1 / 50 | | 380 - 415 / 3 / 50 | | 380 - 415 / 3 / 50 | |
| EER | | | 3.7 | | - | | - | |
| COP | | | - | 3.7 | - | | - | |
| ROW / FIN PER INCH | | | 3 / 13 | | 3 / 14 | | 3 / 14 | |
| FACE AREA | | $m^2$ | 0.267 | | 0.315 | | 0.315 | |
| FAN | POWER INPUT | W | 261 | | 275 | | 473 | |
| | Depth | mm | 254 | | 254 | | 254 | |
| | Width | mm | 203 | | 254 | | 254 | |
| AIR FLOW | | CFM | 940 | | 1176 | | 1470 | |
| | | L/s | 444 | | 555 | | 694 | |
| WATER FLOW | | GPM | 6.97 | | - | | - | |
| | | L/s | 0.222 | | 0.305 | | 0.361 | |
| WATER PRESSURE DROP | | $mH_2O$ | 2 | | 2.5 | | 3.5 | |
| WATER CONNECTIONS | | FPT | 3/4 | | | | | |
| CONNECTIONS | I.D. | mm | 19.05 | | | | | |
| WEIGHT | OPERATING | kg | 125 | | - | | - | |
| | SHIPPING | Kg | 160 | | - | | - | |

Rated in accordance with ANSI/ARI Standard 320-1998

**Notes:**

1. a) EER = Energy Efficiency Ratio
   b) COP = Coefficient of Performance
   c) L/s = Liters per second
2. Nominal cooling and heating capacity are based on the conditions below：
   a) Cooling Capacity is based on 26.7°C (80°F) (DB), 19.4°C (67°F) (WB) entering air temp and 29.6°C (85°F)entering, 35°C (95°F) leaving water temp。
   b) Heating Capacity is based on 21.1°C (70°F) (DB) entering air temp and 21.1°C (70°F) entering water temp。
3. All specifications are subjected to change by manufacture without prior notice.

## Airflow Correction Factors

| | Percent of Nominal Airflow | | | | | | |
|---|---|---|---|---|---|---|---|
| | **85** | **90** | **95** | **100** | **105** | **110** | **115** |
| **Total Cooling Capillary** | 0.972 | 0.982 | 0.994 | 1.000 | 1.007 | 1.010 | 1.013 |
| **Sensible Cooling Capillary** | 0.926 | 0.948 | 0.974 | 1.000 | 1.027 | 1.055 | 1.066 |
| **kW -Cooling** | 0.977 | 0.984 | 0.993 | 1.000 | 1.011 | 1.018 | 1.028 |
| **Total Heat Of Rejection** | 0.975 | 0.983 | 0.991 | 1.000 | 1.008 | 1.015 | 1.018 |
| **Total Heating Capillary** | 0.967 | 0.978 | 0.990 | 1.000 | 1.009 | 1.017 | 1.024 |
| **kW -Heating** | 1.009 | 1.006 | 1.003 | 1.000 | 0.997 | 0.995 | 0.993 |
| **Total Heat Of Absorption** | 0.967 | 0.976 | 0.989 | 1.000 | 1.010 | 1.019 | 1.025 |

## Fan Performance Table

50 cycle, 220volts, single phase (includes allowance for dry coil, and no filter)

| **MODEL** | **FAN SPEED** | **EXTERNAL STATIC PRESSURE (Pa)** | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | **30** | **50** | **80** | **100** | **120** | **150** | **170** |
| **MWV015A/AR** | HI | | | | 208 | | - | - |
| | LOW | | | | 139 | | - | - |
| **MWV020A/AR** | HI | | | | 283 | | - | - |
| | LOW | | | | 197 | | - | - |
| **MWV025A/AR** | HI | 404 | 400 | 385 | 375 | 350 | 269 | - |
| | LOW | 324 | 317 | 294 | 284 | 275 | 208 | - |
| **MWV030A/AR** | HI | 484 | 483 | 461 | 457 | 453 | 420 | - |
| | LOW | 354 | 358 | 352 | 345 | 338 | 302 | - |
| **MWV040A/AR** | HI | 703 | 667 | 619 | 576 | 542 | 453 | - |
| | LOW | 542 | 531 | 498 | 472 | 435 | 353 | - |
| **MWV050A/AR** | HI | | | | | 694 | | |
| | LOW | | | | | 500 | | |

## Electrical Data

The electrical data is based at 220V~/50Hz and 380V/3N/50Hz

| **MODEL** | **Power** | | | **Compressor** | | **Fan Motor FLA** | **Total Unit FLA** | **Voltage Range** | **Max. Circuit Ampacity** | **Max. Fuse Size** |
|---|---|---|---|---|---|---|---|---|---|---|
| | **Voltage** | **Hz** | **Phase** | **RLA** | **LRA** | | | | | |
| **MWV015A/AR** | 220/240 | 50 | 1 | 6.1 | 26 | 0.5 | 5.2 | 187~264 | 6 | 15 |
| **MWV020A/AR** | 220/240 | 50 | 1 | 8.6 | 34 | 1 | - | 187~264 | - | - |
| **MWV025A/AR** | 220/240 | 50 | 1 | 10.2 | 47 | 0.85 | 9.8 | 187~264 | 12.1 | 20 |
| **MWV030A/AR** | 220/240 | 50 | 1 | 13 | 54 | 1.15 | 13.1 | 187~264 | 18.8 | 25 |
| **MWV040A/AR** | 380/415 | 50 | 3 | 4.8 | 42 | 1.3 | 5.8 | 342~456 | 7.8 | 15 |
| **MWV050A/AR** | 380/415 | 50 | 3 | 7 | 42 | 3.6 | - | 342~456 | - | - |

# Operating Limits

### Air limits °C (SI units)

| | Cooling | Heating |
|---|---|---|
| **Min. Ambient Air** | 19.4 | 21 |
| **Normal Ambient Air** | 26.7 | 21 |
| **Max. Ambient Air** | 35 | 26.7 |
| **Min. Entering Air (1)&(2)** | 19.4 | 21 |
| **Normal Entering Air, DB/WB** | 26.7/19.4 | 21 |
| **Max. Entering Air, DB/WB (1)&(2)** | 35/21.7 | 26.7 |

**Note:**
1. At ARI flow rate
2. Max and min values may not be combined. If one value is at max or min, the other two conditions may not exceed the normal condition.

**Water enthalpy °C (SI units)**

| | Cooling | Heating |
|---|---|---|
| **Min. Entering Water (1)&(2)** | 13 | 10 |
| **Normal Entering Water** | 29.4 | 21 |
| **Max. Entering Water (1)&(2)** | 40 | 32 |

## Environment

This equipment is designed for indoor installation only. Sheltered locations such as attics, garages, etc., generally will not provide sufficient protection against extremes in temperature and/or humidity, and equipment performance, reliability, and service life may be adversely affected.

## Power supply

A voltage variation of ±10% of nameplate utilization voltage is acceptable. Three-phase system unbalance shall not exceed 2%.

## Operating voltages

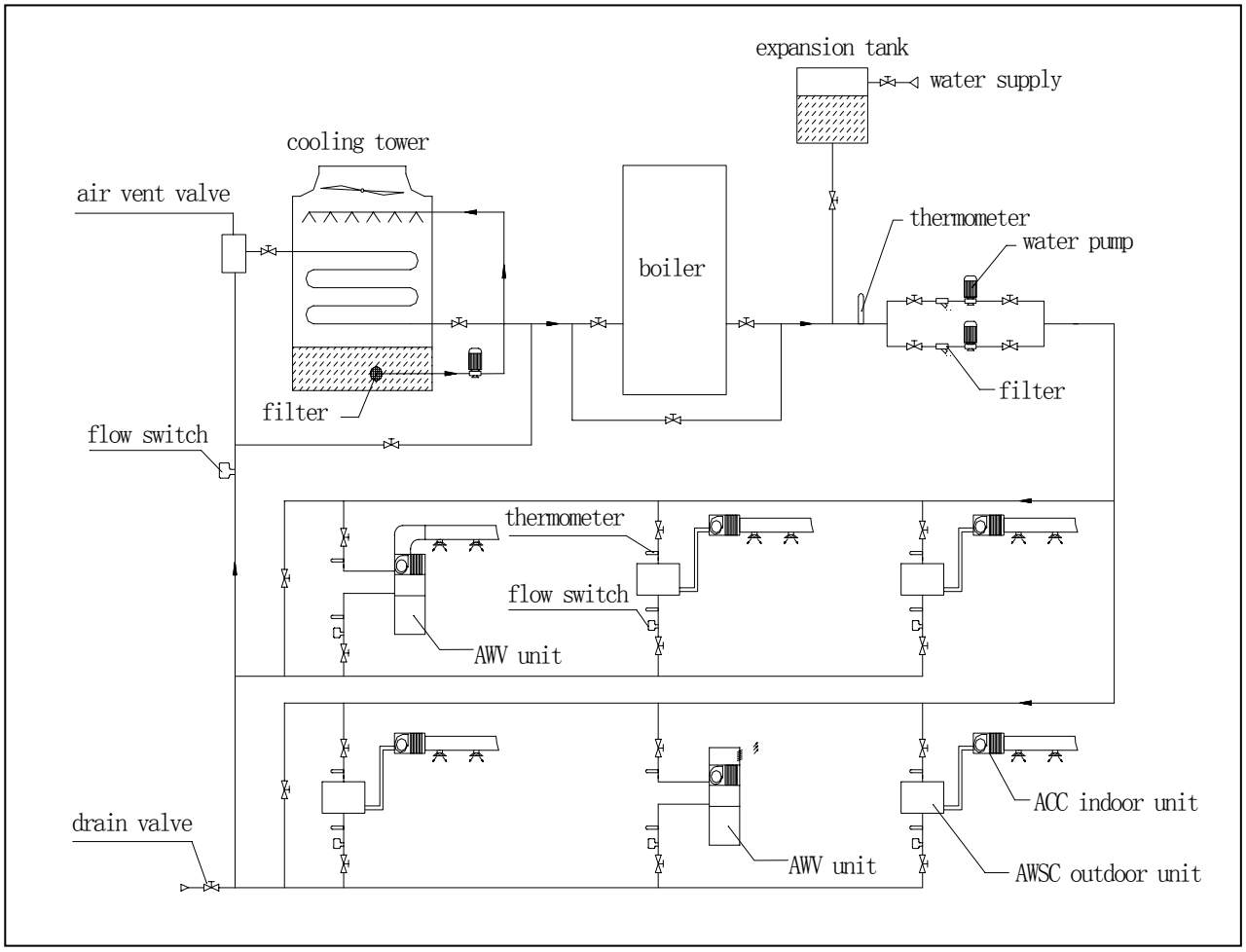
220-240V~/50Hz ---------- 198V min., 264V max.
380-415V/3N/50Hz ---------- 342V min., 456V max.

**Additional information (initial start-up only)**

Standard conditions are guaranteed to start and operate in an ambient temperature of 5°C, with entering air at 5°C, with entering water at 21°C, with both air and water at the flow rates used in the ARI Standard 320-86 rating test, for initial start-up in winter.

***Note****: This is not a normal or continuous operating condition. It is assumed that such a start-up is for the purpose of bringing the building space up to occupancy temperature.*

# Water Loop System Diagram



# Performance Tables

**Model: MWV 015A/AR** Air Flow: 760m$^3$/h Electrical Characteristics: 220V / 1Ph / 50Hz

| Water Flow ($m^3/h$) | E.W.T ($^oC$) | COOLING | | | HEATING | |
|---|---|---|---|---|---|---|
| | | O.W.T ($^oC$) | E.A.T ($^oC$) | Capacity (W) | E.A.T ($^oC$) | Capacity (W) |
| 0.82 | 10 | - | - | - | 16 | 3995 |
| | | | - | - | 21 | 4014 |
| | | | - | - | 27 | 4094 |
| 0.82 | 13 | 18 | 19.4/13.9 | 5002 | 16 | 4119 |
| | | | 26.7/19.4 | 5204 | 21 | 4160 |
| | | | 35/21.7 | 5308 | 27 | 4243 |
| 0.82 | 16 | 21 | 19.4/13.9 | 4856 | 16 | 4246 |
| | | | 26.7/19.4 | 5028 | 21 | 4311 |
| | | | 35/21.7 | 5129 | 27 | 4397 |
| 0.82 | 21 | 26 | 19.4/13.9 | 4715 | 16 | 4378 |
| | | | 26.7/19.4 | 4858 | 21 | 4467 |
| | | | 35/21.7 | 4955 | 27 | 4556 |
| 0.82 | 27 | 32 | 19.4/13.9 | 4578 | 16 | 4509 |
| | | | 26.7/19.4 | 4694 | 21 | 4623 |
| | | | 35/21.7 | 4788 | 27 | 4716 |
| 0.82 | 30 | 35 | 19.4/13.9 | 4444 | 16 | 4644 |
| | | | 26.7/19.4 | 4535 | 21 | 4785 |
| | | | 35/21.7 | 4626 | 27 | 4881 |
| 0.82 | 32 | 37 | 19.4/13.9 | 4311 | 16 | 4784 |
| | | | 26.7/19.4 | 4376 | 21 | 4953 |
| | | | 35/21.7 | 4464 | 27 | 5052 |
| 0.82 | 38 | 43 | 19.4/13.9 | 4182 | - | - |
| | | | 26.7/19.4 | 4223 | - | - |
| | | | 35/21.7 | 4308 | - | - |
| 0.82 | 40 | 45 | 19.4/13.9 | 4056 | - | - |
| | | | 26.7/19.4 | 4075 | - | - |
| | | | 35/21.7 | 4157 | - | - |

E.W.T = Entering Water Temperature E.A.T = Entering Air Temperature
O.W.T = Leaving Water Temperature

**Model: MWV 020A/AR** Air Flow: 1020$m^3$/h Electrical Characteristics: 220V / 1Ph / 50Hz

| Water Flow ($m^3$/h) | E.W.T ($^oC$) | COOLING | | | HEATING | |
|---|---|---|---|---|---|---|
| | | O.W.T ($^oC$) | E.A.T ($^oC$) | Capacity (W) | E.A.T ($^oC$) | Capacity (W) |
| 1.1 | 10 | - | - | - | 16 | 5367 |
| | | | - | - | 21 | 5392 |
| | | | - | - | 27 | 5500 |
| 1.1 | 13 | 18 | 19.4/13.9 | 6177 | 16 | 5532 |
| | | | 26.7/19.4 | 6426 | 21 | 5587 |
| | | | 35/21.7 | 6555 | 27 | 5699 |
| 1.1 | 16 | 21 | 19.4/13.9 | 5997 | 16 | 5704 |
| | | | 26.7/19.4 | 6209 | 21 | 5790 |
| | | | 35/21.7 | 6333 | 27 | 5906 |
| 1.1 | 21 | 26 | 19.4/13.9 | 5822 | 16 | 5880 |
| | | | 26.7/19.4 | 5999 | 21 | 6000 |
| | | | 35/21.7 | 6119 | 27 | 6120 |
| 1.1 | 27 | 32 | 19.4/13.9 | 5653 | 16 | 6056 |
| | | | 26.7/19.4 | 5796 | 21 | 6210 |
| | | | 35/21.7 | 5912 | 27 | 6334 |
| 1.1 | 30 | 35 | 19.4/13.9 | 5488 | 16 | 6238 |
| | | | 26.7/19.4 | 5600 | 21 | 6427 |
| | | | 35/21.7 | 5712 | 27 | 6556 |
| 1.1 | 32 | 37 | 19.4/13.9 | 5323 | 16 | 6425 |
| | | | 26.7/19.4 | 5404 | 21 | 6652 |
| | | | 35/21.7 | 5512 | 27 | 6785 |
| 1.1 | 38 | 43 | 19.4/13.9 | 5164 | - | - |
| | | | 26.7/19.4 | 5215 | - | - |
| | | | 35/21.7 | 5319 | - | - |
| 1.1 | 40 | 45 | 19.4/13.9 | 5009 | - | - |
| | | | 26.7/19.4 | 5032 | - | - |
| | | | 35/21.7 | 5133 | - | - |

E.W.T = Entering Water Temperature E.A.T = Entering Air Temperature
O.W.T = Leaving Water Temperature

**Model: MWV 025A/AR** Air Flow: 1200$m^3$/h Electrical Characteristics: 220V / 1Ph / 50Hz

| Water Flow ($m^3$/h) | E.W.T ($^oC$) | COOLING | | | HEATING | |
|---|---|---|---|---|---|---|
| | | O.W.T ($^oC$) | E.A.T ($^oC$) | Capacity (W) | E.A.T ($^oC$) | Capacity (W) |
| 1.32 | 10 | - | - | - | 16 | 6708 |
| | | | - | - | 21 | 6740 |
| | | | - | - | 27 | 6875 |
| 1.32 | 13 | 18 | 19.4/13.9 | 7721 | 16 | 6916 |
| | | | 26.7/19.4 | 8033 | 21 | 6984 |
| | | | 35/21.7 | 8193 | 27 | 7124 |
| 1.32 | 16 | 21 | 19.4/13.9 | 7496 | 16 | 7130 |
| | | | 26.7/19.4 | 7761 | 21 | 7238 |
| | | | 35/21.7 | 7916 | 27 | 7382 |
| 1.32 | 21 | 26 | 19.4/13.9 | 7278 | 16 | 7350 |
| | | | 26.7/19.4 | 7499 | 21 | 7500 |
| | | | 35/21.7 | 7649 | 27 | 7650 |
| 1.32 | 27 | 32 | 19.4/13.9 | 7066 | 16 | 7571 |
| | | | 26.7/19.4 | 7245 | 21 | 7763 |
| | | | 35/21.7 | 7390 | 27 | 7918 |
| 1.32 | 30 | 35 | 19.4/13.9 | 6860 | 16 | 7798 |
| | | | 26.7/19.4 | 7000 | 21 | 8034 |
| | | | 35/21.7 | 7140 | 27 | 8195 |
| 1.32 | 32 | 37 | 19.4/13.9 | 6654 | 16 | 8032 |
| | | | 26.7/19.4 | 6755 | 21 | 8315 |
| | | | 35/21.7 | 6890 | 27 | 8482 |
| 1.32 | 38 | 43 | 19.4/13.9 | 6455 | - | - |
| | | | 26.7/19.4 | 6519 | - | - |
| | | | 35/21.7 | 6649 | - | - |
| 1.32 | 40 | 45 | 19.4/13.9 | 6261 | - | - |
| | | | 26.7/19.4 | 6290 | - | - |
| | | | 35/21.7 | 6416 | - | - |

E.W.T = Entering Water Temperature E.A.T = Entering Air Temperature
O.W.T = Leaving Water Temperature

**Model: MWV 030A/AR** Air Flow: 1650$m^3$/h Electrical Characteristics: 220V / 1Ph / 50Hz

| Water Flow ($m^3$/h) | E.W.T ($^oC$) | COOLING | | | HEATING | |
|---|---|---|---|---|---|---|
| | | O.W.T ($^oC$) | E.A.T ($^oC$) | Capacity (W) | E.A.T ($^oC$) | Capacity (W) |
| 1.59 | 10 | - | - | - | 16 | 8944 |
| | | | - | - | 21 | 8986 |
| | | | - | - | 27 | 9166 |
| 1.59 | 13 | 18 | 19.4/13.9 | 9927 | 16 | 9221 |
| | | | 26.7/19.4 | 10328 | 21 | 9312 |
| | | | 35/21.7 | 10534 | 27 | 9498 |
| 1.59 | 16 | 21 | 19.4/13.9 | 9638 | 16 | 9506 |
| | | | 26.7/19.4 | 9978 | 21 | 9650 |
| | | | 35/21.7 | 10178 | 27 | 9843 |
| 1.59 | 21 | 26 | 19.4/13.9 | 9357 | 16 | 9800 |
| | | | 26.7/19.4 | 9641 | 21 | 10000 |
| | | | 35/21.7 | 9834 | 27 | 10200 |
| 1.59 | 27 | 32 | 19.4/13.9 | 9085 | 16 | 10094 |
| | | | 26.7/19.4 | 9315 | 21 | 10350 |
| | | | 35/21.7 | 9501 | 27 | 10557 |
| 1.59 | 30 | 35 | 19.4/13.9 | 8820 | 16 | 10397 |
| | | | 26.7/19.4 | 9000 | 21 | 10712 |
| | | | 35/21.7 | 9180 | 27 | 10926 |
| 1.59 | 32 | 37 | 19.4/13.9 | 8555 | 16 | 10709 |
| | | | 26.7/19.4 | 8685 | 21 | 11087 |
| | | | 35/21.7 | 8859 | 27 | 11309 |
| 1.59 | 38 | 43 | 19.4/13.9 | 8299 | - | - |
| | | | 26.7/19.4 | 8381 | - | - |
| | | | 35/21.7 | 8549 | - | - |
| 1.59 | 40 | 45 | 19.4/13.9 | 8050 | - | - |
| | | | 26.7/19.4 | 8088 | - | - |
| | | | 35/21.7 | 8249 | - | - |

E.W.T = Entering Water Temperature E.A.T = Entering Air Temperature
O.W.T = Leaving Water Temperature

**Model: MWV 040A/AR** Air Flow: 1950$m^3$/h Electrical Characteristics: 380V / 3Ph / 50Hz

| Water Flow ($m^3$/h) | E.W.T ($^oC$) | COOLING | | | HEATING | |
|---|---|---|---|---|---|---|
| | | O.W.T ($^oC$) | E.A.T ($^oC$) | Capacity (W) | E.A.T ($^oC$) | Capacity (W) |
| 1.92 | 10 | - | - | - | 16 | 11180 |
| | | | - | - | 21 | 11233 |
| | | | - | - | 27 | 11458 |
| 1.92 | 13 | 18 | 19.4/13.9 | 12133 | 16 | 11526 |
| | | | 26.7/19.4 | 12623 | 21 | 11640 |
| | | | 35/21.7 | 12875 | 27 | 11873 |
| 1.92 | 16 | 21 | 19.4/13.9 | 11780 | 16 | 11883 |
| | | | 26.7/19.4 | 12196 | 21 | 12063 |
| | | | 35/21.7 | 12440 | 27 | 12304 |
| 1.92 | 21 | 26 | 19.4/13.9 | 11437 | 16 | 12250 |
| | | | 26.7/19.4 | 11783 | 21 | 12500 |
| | | | 35/21.7 | 12019 | 27 | 12750 |
| 1.92 | 27 | 32 | 19.4/13.9 | 11103 | 16 | 12618 |
| | | | 26.7/19.4 | 11385 | 21 | 12938 |
| | | | 35/21.7 | 11613 | 27 | 13196 |
| 1.92 | 30 | 35 | 19.4/13.9 | 10780 | 16 | 12996 |
| | | | 26.7/19.4 | 11000 | 21 | 13390 |
| | | | 35/21.7 | 11220 | 27 | 13658 |
| 1.92 | 32 | 37 | 19.4/13.9 | 10457 | 16 | 13386 |
| | | | 26.7/19.4 | 10615 | 21 | 13859 |
| | | | 35/21.7 | 10827 | 27 | 14136 |
| 1.92 | 38 | 43 | 19.4/13.9 | 10143 | - | - |
| | | | 26.7/19.4 | 10243 | - | - |
| | | | 35/21.7 | 10448 | - | - |
| 1.92 | 40 | 45 | 19.4/13.9 | 9839 | - | - |
| | | | 26.7/19.4 | 9885 | - | - |
| | | | 35/21.7 | 10083 | - | - |

E.W.T = Entering Water Temperature E.A.T = Entering Air Temperature
O.W.T = Leaving Water Temperature

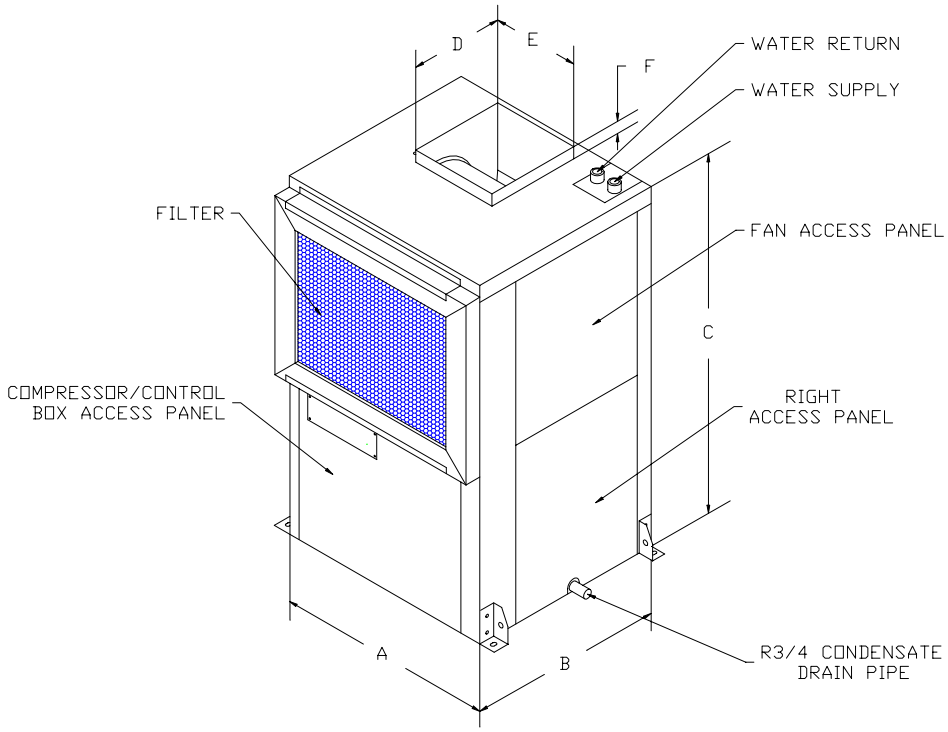
**Model: MWV 050A/AR** Air Flow: 2500$m^3$/h Electrical Characteristics: 380V / 3Ph / 50Hz

| Water Flow ($m^3$/h) | E.W.T ($^oC$) | COOLING | | | HEATING | |
|---|---|---|---|---|---|---|
| | | O.W.T ($^oC$) | E.A.T ($^oC$) | Capacity (W) | E.A.T ($^oC$) | Capacity (W) |
| 2.3 | 10 | - | - | - | 16 | 13416 |
| | | | - | - | 21 | 13479 |
| | | | - | - | 27 | 13749 |
| 2.3 | 13 | 18 | 19.4/13.9 | 14890 | 16 | 13831 |
| | | | 26.7/19.4 | 15492 | 21 | 13968 |
| | | | 35/21.7 | 15801 | 27 | 14248 |
| 2.3 | 16 | 21 | 19.4/13.9 | 14457 | 16 | 14259 |
| | | | 26.7/19.4 | 14968 | 21 | 14475 |
| | | | 35/21.7 | 15267 | 27 | 14765 |
| 2.3 | 21 | 26 | 19.4/13.9 | 14036 | 16 | 14700 |
| | | | 26.7/19.4 | 14462 | 21 | 15000 |
| | | | 35/21.7 | 14751 | 27 | 15300 |
| 2.3 | 27 | 32 | 19.4/13.9 | 13627 | 16 | 15141 |
| | | | 26.7/19.4 | 13973 | 21 | 15525 |
| | | | 35/21.7 | 14252 | 27 | 15836 |
| 2.3 | 30 | 35 | 19.4/13.9 | 13230 | 16 | 15595 |
| | | | 26.7/19.4 | 13500 | 21 | 16068 |
| | | | 35/21.7 | 13770 | 27 | 16390 |
| 2.3 | 32 | 37 | 19.4/13.9 | 12833 | 16 | 16063 |
| | | | 26.7/19.4 | 13028 | 21 | 16631 |
| | | | 35/21.7 | 13288 | 27 | 16963 |
| 2.3 | 38 | 43 | 19.4/13.9 | 12448 | - | - |
| | | | 26.7/19.4 | 12572 | - | - |
| | | | 35/21.7 | 12823 | - | - |
| 2.3 | 40 | 45 | 19.4/13.9 | 12075 | - | - |
| | | | 26.7/19.4 | 12132 | - | - |
| | | | 35/21.7 | 12374 | - | - |

E.W.T = Entering Water Temperature E.A.T = Entering Air Temperature
O.W.T = Leaving Water Temperature

# Dimensions Data

All dimensions are approximate. Certified drawings available upon request.




| UNIT SIZE | DIMENSIONS | | | | | | | | | | | | WATER CONNECTIONS (FPT) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | | B | | C | | D | | E | | F | | |
| | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm | inch | mm | |
| **015 & 020** | 23.15 | 588 | 22.24 | 565 | 38.58 | 980 | 8.2 | 208 | 9.1 | 232 | 1.2 | 30 | 3/4 |
| **025 & 030** | 26.18 | 665 | 23.46 | 596 | 42.56 | 1081 | 11.3 | 287 | 10.5 | 267 | 1.2 | 30 | 3/4 |
| **40** | 30.12 | 765 | 24.25 | 616 | 48.82 | 1240 | 11.3 | 287 | 13.1 | 334 | 1.2 | 30 | 1 |
| **50** | 30.12 | 765 | 26.22 | 666 | 48.82 | 1240 | 11.3 | 287 | 13.1 | 334 | 1.2 | 30 | 1 |

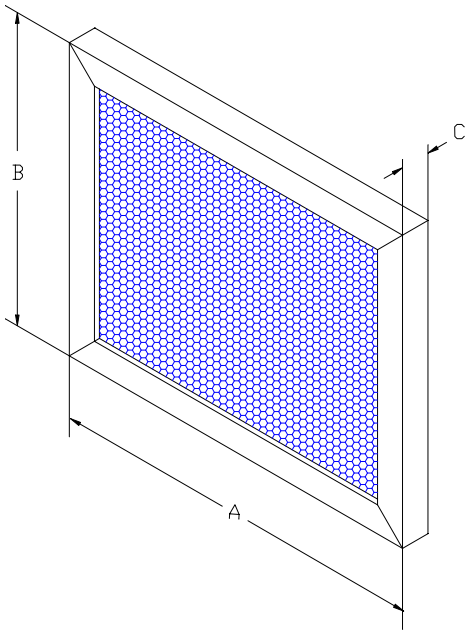
## Optional Return Air Duct Filter

Standard 1” (21mm)

| UNIT SIZE | A | | B | | C | |
|---|---|---|---|---|---|---|
| | inch | mm | inch | mm | inch | mm |
| **015 & 020** | 21.85 | 555 | 17 | 432 | 1 | 21 |
| **025 & 030** | 24.6 | 625 | 20.75 | 527 | 1 | 21 |
| **040 & 050** | 28.2 | 725 | 20.75 | 527 | 1 | 21 |

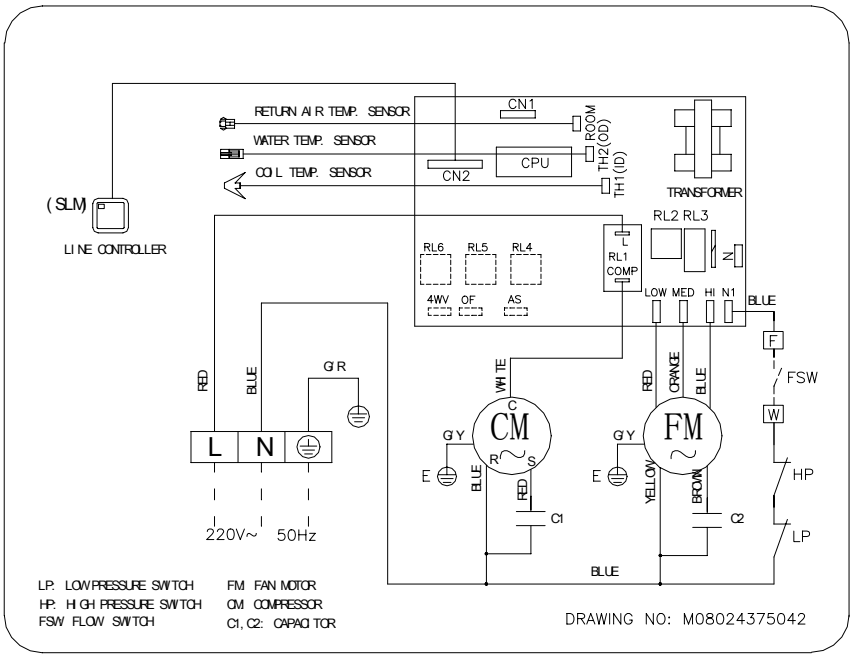
Optional 2” (51mm)

| UNIT SIZE | A | | B | | C | |
|---|---|---|---|---|---|---|
| | inch | mm | inch | mm | inch | mm |
| **015 & 020** | 21.85 | 555 | 17 | 432 | 2 | 51 |
| **025 & 030** | 24.6 | 625 | 20.75 | 527 | 2 | 51 |
| **040 & 050** | 28.2 | 725 | 20.75 | 527 | 2 | 51 |

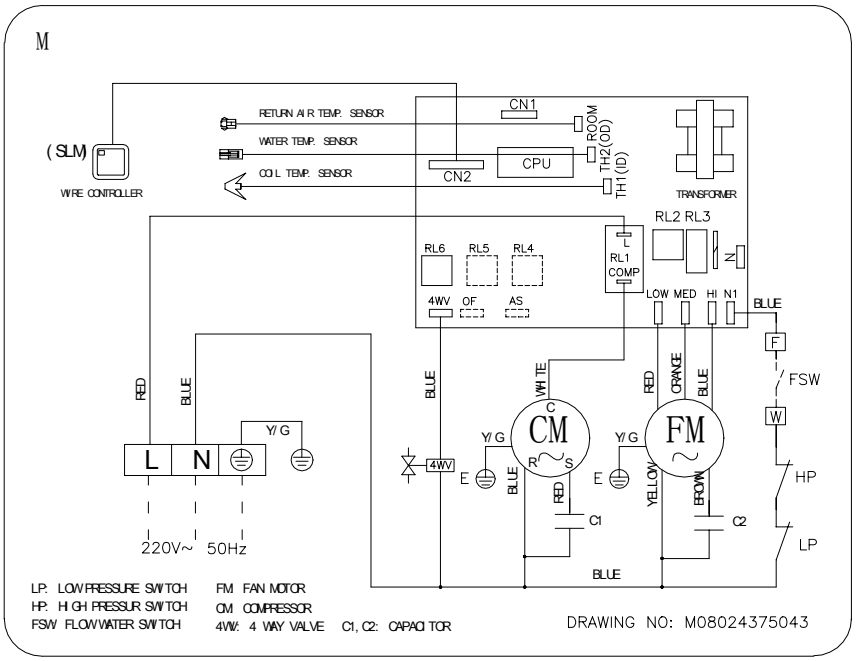


# Wiring Diagrams

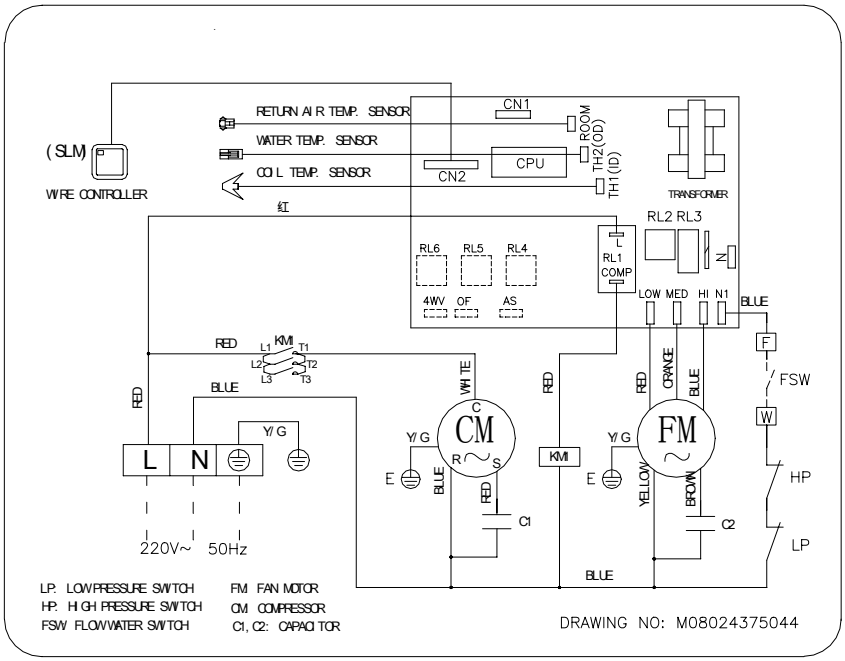
## Model: MWV 015 / 020A



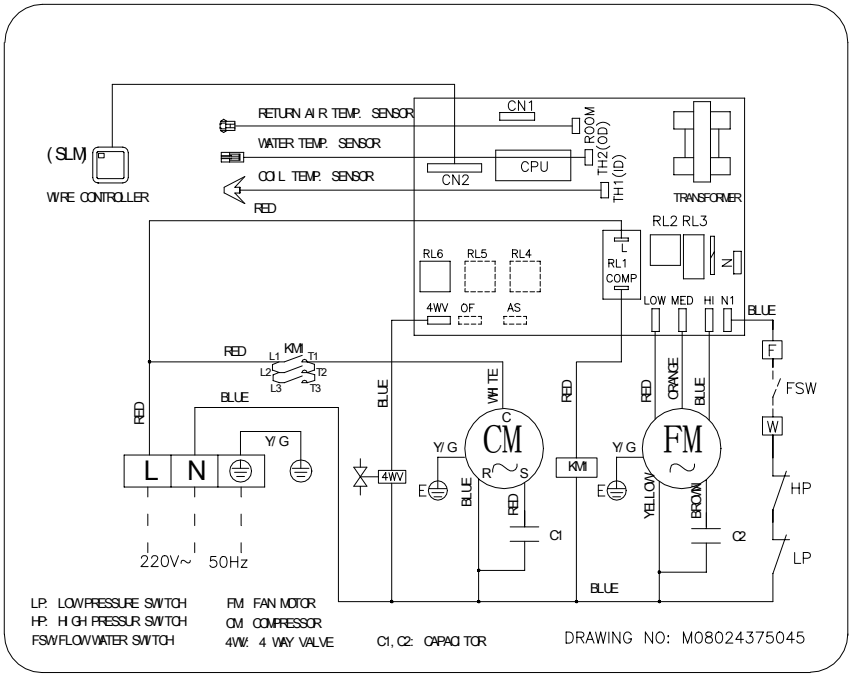

## Model: MWV 015 / 020 AR



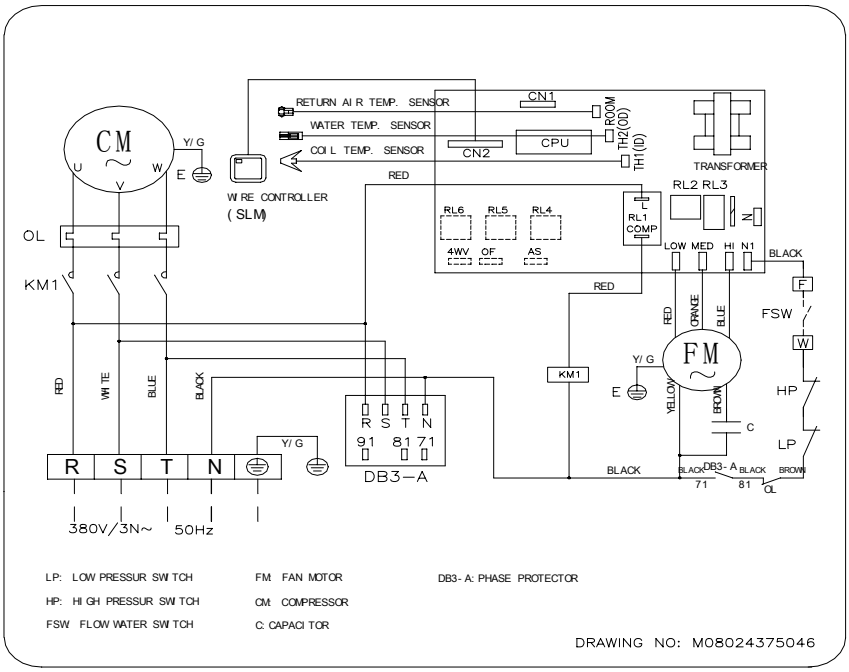
**Model: MWV 025 / 030 A**



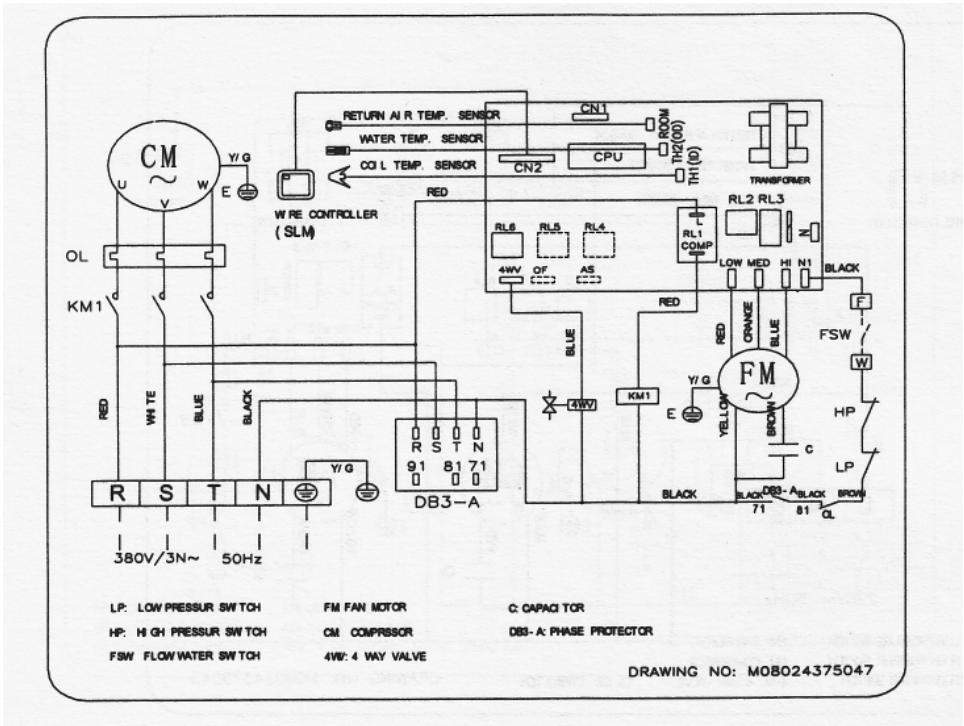

**Model: MWV 025 / 030 AR**



**Model: MWV 040 / 050 A**




**Model: MWV 040 / 050 AR**



# Transportation and Storage

Upon receipt of the equipment, check the carton for visible damage. Make a notation on the shipper's delivery ticket before signing. If there is any evidence of rough handing, the cartons should be opened at once to check for concealed damage, If any damage is found, notify the carrier within 48 hours to establish your claim and request their inspection and a report. The Warranty Claims Department should then be contacted.

Don't stand or transport the machine on their sides, For storing, each carton is marked with "up-arrows.

In the event that elevator transfer makes horizontal positioning unavoidable, absolutely insure that the machine is in the normal upright position for at least 24 hours before operating.

Temporary storage at the joist must be indoors, completely shields from rain, snow, etc. High or Low temperature naturally associated with weather pattern will not harm the conditioners. Excessively high temperature of 160°F (60ºC) may deteriorate certain plastic materials and cause permanent damage. In addition, the solid-state circuit boards may experience operating problems.

# Installation

## General

1. To prevent damage, this equipment should not be operated for supplementary heating and cooling during the construction period.
2. Inspect the carton for any specific tagging numbers as requested by the installing contactor. At this time the voltage, phase and capacity should be checked against the plans.
3. Check the unit sizes against the plans to be sure that the unit will be installed in the correct location.
4. Before installation, check the available closet dimension versus the dimensions of the unit.
5. Pay attention to the location and routing of water piping, and electrical wiring. The locations of these items are clearly marked on submittal drawings.
6. The installing contractor will find it beneficial to confer with piping, sheet metal, ceiling and electrical foreman together before installing any conditioners.

## Unit location

1. Locate the unit in an area that allows for easy removal of the filter and access panels, and has enough space for service personnel to perform maintenance of repair. Provide sufficient room to make water, electrical and duct connections.
2. The contractor should make sure that access has provided including clearance for duct collars and fittings at water and electrical connections.
3. Allow adequate room around the unit for a condensate trap.
4. The unit can be installed in an equipment room. However, closet installations are more common for small vertical type units. Generally, the unit is located in the corner of a closet with the non-ducted, return air facing 90° to the door and the major access panels facing the door (Figure A). Alternatively, the unit can have a ducted return air with the opening facing the door and the major access panels facing 90° to the door (Figure B).
5. It is recommended that the unit be located on top of a vibration absorbing material such as rubber or carpet to reduce any vibration.
6. If optional field installed controls are required (boilerless systems), space must be provided for the enclosure to mount around the corner from the electrical entrances. Do not locate the side of the unit too close to a wall.

## Typical closet installation with louver door return & with ducted return

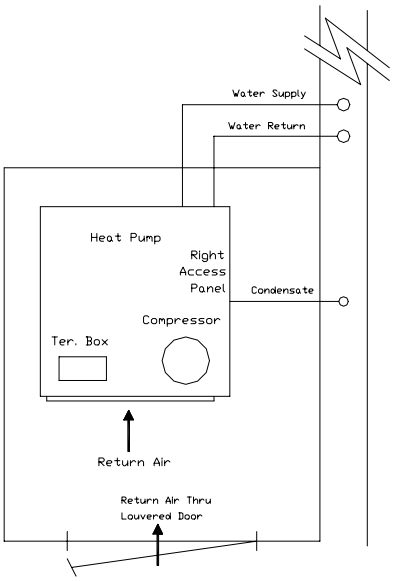



FIGURE A

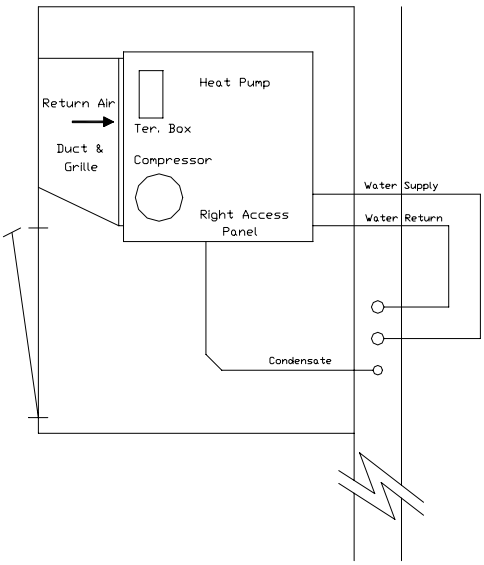



FIGURE B

## Duct and attenuation

Discharge ductwork is normally used with these conditioners. Return air ductwork may also be required, but will require field installation of a 1" or 2" (21 or 51mm) return air duct collar/ filter rack kit.

The discharge duct system will normally consist of a flexible connector at the unit, a non-insulation piece of the full duct size, a short run of duct, an elbow without vanes, and a trunk duct teeing into a branch circuit with discharge diffusers as shown in FIGURE C.

The transition piece must not have an angle greater than 30 ° or severer loss of air performance can result. Do not connect the full duct size to the unit without using a transition down to the size of the discharge collar on the unit. With metal duct material, the sides only of the elbow and entirebranch duct should be internally lined with acoustic insulation for sound attenuation. Glass fiber duct board material is more absorbing and may permit omission of the flexible connector.

The ductwork should be laid out so that there is no line of sight between the conditioner discharge and the distribution diffusers.

Return air ducts can be brought in through a wall grille and then to the unit. The return duct system will normally consist of a flexible connector at the unit and a trunk duct to the return air grille. With metal duct material, the return air duct should be internally lined with acoustic insulation for sound attenuation. Glass fiber duct board material is more absorbing and may permit omission of the fiexible connector.

Return air ductwork to the unit requires the optional 2" (51mm) return air duct collar/filter rack kit. The kit can be installed for face side or bottom filter removal. The flexible connector can then be attached to the 1" (25mm) duct collar.

Don't use sheet metal screws directly into the unit cabinet for connection of supply or return air ductwork, especially return air ductwork which can puncture the drain pan or the air coil.

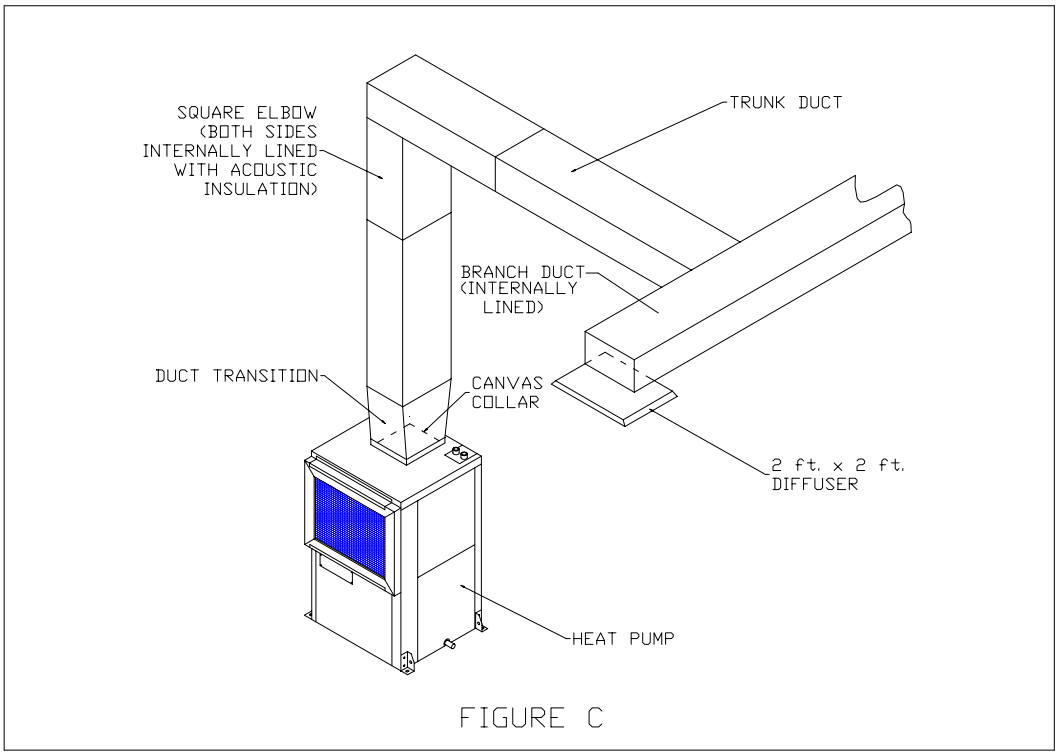


FIGURE C

## Ventilation Air

Outside air may be required for ventilation. The temperature of the ventilation air must be controlled so that mixture of outside air and return air entering the conditioner does not exceed application limits. It is also general practice to close off the ventilation air system during unoccupied periods (night setback).
The ventilation air system is generally a separate building subsystem with distribution ductwork. Simple introduction of the outside air into each return air plenum chamber reasonably close to the conditioner air inlet is not only adequate, but also recommended. Do not duct outside air directly to the conditioner inlet. Provide sufficient distance for thorough mixing of outside and return air.

## General

1. Be sure the available power is the same voltage and phase as that shown on the unit serial plate. Line and low voltage wiring must be done in accordance with local codes or the National Electrical Code, whichever is applicable.
2. Apply correct line voltage to the unit. Two 7/8" (22mm) holes are supplied on the side of the unit. A disconnect switch near the unit is repaired by code. Power to the unit must be sized correctly and have time delay (dual element) fuses or a HACR circuit breaker for branch circuit overcurrent protection. See the nameplate for correct ratings.

## 220-240 Volt operation and 50 cycle units

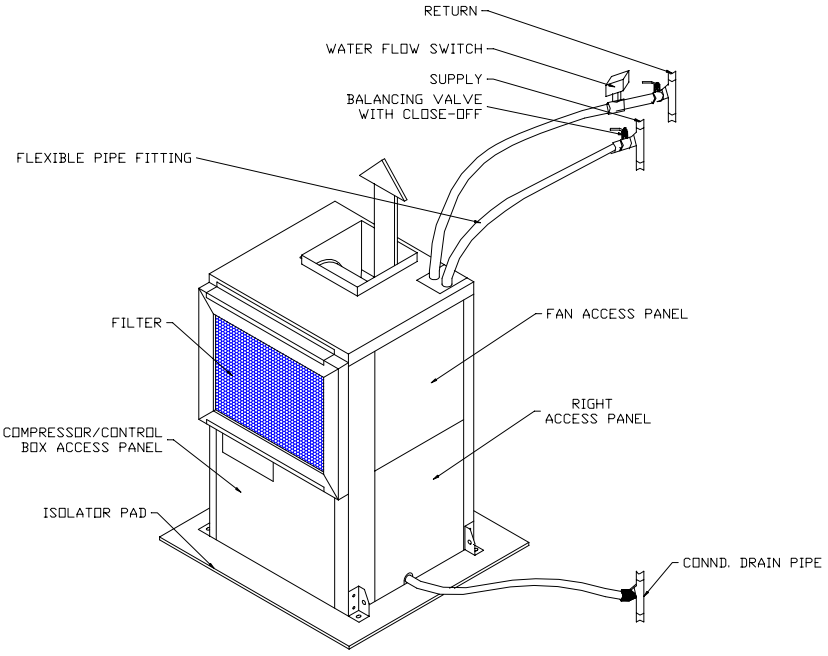
All 220-240 volt single and three-phase units are factory wired for 220 and 380 volt operation. For 240-volt operation, the line voltage tap on the 18-volt transformer must be changed. Disconnect and cap the red lead wire and interchange it with the orange lead wire on the primary of the 18-volt transformer. Three-phase 50 cycle units require a neutral wire for 220-240/1/50 power.

## Fan speed change

All units have three-speed fan motors (HI, MID, LOW) and are shipped for HI, MID & LOW speeds operation. On unit sizes 015 though 050, each fan motor is supplied with a 6-pin terminal block mounted on the fan motor.

## Piping

1. All units are recommended to be connected to supply and return piping in a two-pipe reverse return configuration. A reverse return system is inherently self-balancing and requires only trim balancing where multiple quantities of units with different flow and pressure drop characteristics are connected to the same loop. A simple way to check for proper water balance is to take a differential temperature reading across the water connections. To insure proper water flow, the differential should be 10°F (5℃) to 14°F (8℃). A direct return system may also be made to word acceptably, but proper water flow balancing is more difficult to achieve and maintain.
2. The piping can be steel, copper or PVC.
3. Supply and return run outs are usually connected to the unit by short lengths of high pressure flexible hose which are sound attenuates for both unit operating noise and hydraulic pumping noise. One end of the hose should have a swivel fitting to facilitate removal for service. Hard piping can also be brought directly to the unit although it is not recommended since no vibration or noise attenuation can be accomplished. The hard piping must have unions to facilitate unit removal. See FIGURE D for typical piping setup.




NOTE: 1. Condensate drain connection must be minimum of 3/4″ below connection to heat pump.
2. Water flow switch must be installed in the water return pipe of heat pump.

FIGURE D

4. Supply and return shutoff valves are required at each conditioner. The return valve is used for balancing and should have a "memory stop" so that it can always be closed off but can only be reopened to the proper position for the flow required.
5. No unit should be connected to the supply and return piping until the water system has been cleaned and flushed completely. After the cleaning and flushing has taken place, the initial connection should have all valves wide open in preparation for water system flushing.
6. Condensate piping can be steel, copper or PVC. Each unit is supplied with a 3/4" (19.05mm) ODM copper stub.
7. The condensate disposal piping must have a trap and the piping must be pitched away from the unit not less than 1/4" inch per foot (20mm per meter). Generally, the condensate trap is made of copper. See FIGURE E. A piece of vinyl hoses from the trap to the drain line is used for simple removal. A complete copper or PVC condensate system can also be used. Union fittings in the copper lines should be applied to facilitate removal.

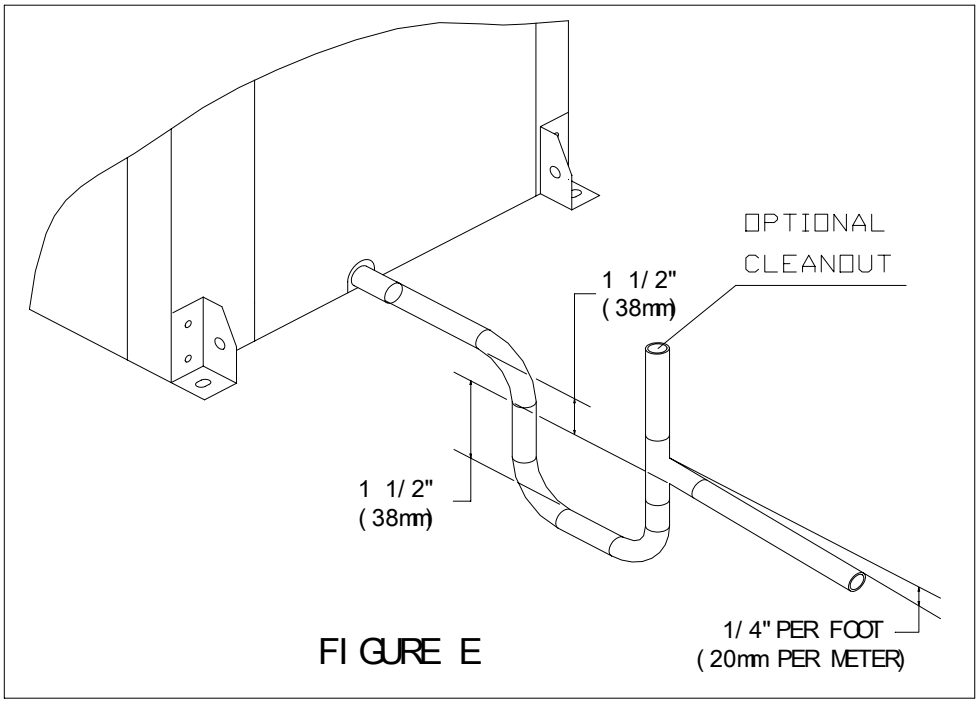


FIGURE E

8. No point in the drain system may be above the drain connection of any unit.
9. Automatic flow controlled devices must not be installed prior to system cleaning and flushing.
10. A high point of the piping system must be vented.
11. **Check local code for the need for dielectric**

## Flexible Hose

Since hose may change in length from +2% to –4% under the surge of high pressure, it is necessary to provide sufficient slack for expansion contraction (see Figure F).

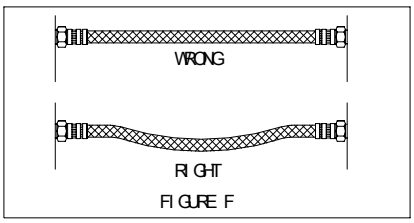


FIGURE F

## Cleaning and Flushing System

1. Prior to first operation of any conditioner, the water circulating system must be cleaned and flushed of all construction dirt and debris.
   If the conditioners are equipped with water shut off valves, either electric or pressure operated, the supply and return run outs must be connected together at each conditioner location. This will prevent the introduction of dirt into the unit. Additionally, pressure operated valves only open when the compressor is operation.
2. The system should be filled at the city water makeup connection with all air vents open. After filling, vents should be closed.
   The contractor should start main circulator with pressure reducing valve makeup open. Vents should be checked in sequence to bleed off any trapped air to assure circulation through all components of the system.
   Power to the heat rejecter unit should be off, and the supplementary heat control set at 80°F (27℃).
   While circulating water, the contractor should check and repair any leaks in the piping. Drain at the lowest point(s) in the system should be opened for initial flush and blow-down, making sure city water fill are set to make up water at the same rate. Check the pressure gauge at pump suction and manually adjust the makeup to hold the same positive steady pressure both before and after opening the drain valves. Flush should continue for at least two hours, or longer if required, to see clear, clean drain water.

3. Supplemental heater and circulator pump should be shut off. All drains and vents should be opened to completely drain down the system. Short circuited supply and return runouts should now be connected to the conditioner supply and return connections. Teflon tape is recommended over pipe dope for pipe dope for pipe thread connections. Do not use sealers at the swivel flare connections of hoses.
4. Trisodium phosphate was formerly recommended as a cleaning agent during flushing. However, many states and localities ban the introduction of phosphates into their sewage systems. The current recommendation is to simply flush linger with warm 80°F (27℃) water.
5. Refill the system with clean water. Test the litmus paper for acidity, and treat as required to leave the water slightly alkaline (pH 7.5 to 8.5). The specified percentage of antifreeze may also be added at this time. **Use commercial grade antifreeze designed for HVAC systems only. Do not use automotive grade antifreeze.**
6. Set the system control and alarm panel heat add setpoint to 70°F (21℃) and the heat rejection setpoint to 85°F (29℃). Supply power to all motors and start the circulating pumps. After full flow has been established through all components including the heat rejecter (regardless of season) and air vented and loop temperatures stabilized, each of the conditioners will be ready for check test and start-up and for air and water balancing.

# Start-Up

1. Open all valves to full open position and turn on power to the conditioners.
2. Set thermostat for "Fan Only" operation by selecting "Off " at the system switch and "On" at the fan switch. If "Auto" fan operation were selected, the fan would cycle with the compressor. Check for proper air delivery.
3. All units have three-speed motors.
4. Set thermostat to "Cool". Many conditioners have time delays which protect the compressor against short cycling. After a few minutes of operation, check the discharge grilles for cool air delivery. Measure the temperature difference between entering and leaving water. It should be approximately 11/2 times greater than the heating mode temperature difference. For example, if the cooling temperature difference is 15°F (8℃), the heating temperature difference should have been 12°F (5℃).
   Without automatic flow control valves, a cooling temperature difference of 10°F to 14°F (5℃ to 8℃) is about right. Adjust the combination shutoff/balancing valve in the return line to a water flow rate which will result in the 10°F to 14°F (5℃ to 8℃) difference.
5. Set thermostat to "Heat ". Set system switch to the "Auto " position and depress the heat setting to the warmest selection. Some conditioners have built-in time delays which prevent the compressor from immediately starting. With most control schemes, the fan will start immediately. After a few minutes of compressor operation, check for warm air delivery at discharge grille. If this is a "cold building" start-up, leave unit running until return air to the unit is at least 65°F (18℃).
   Measure the temperature difference between entering and leaving air and entering and leaving water. With entering water of 60°F to 80°F (16℃ to 27℃), leaving water should be 6°F to 12°F(3.3℃ to 6.7℃) cooler, and the air temperature rise through the machine should not exceed 35°F(19℃). If the air temperature exceeds 35°F(19℃), the airflow rate is probably inadequate.
   If the water temperature difference is less than 6°F (3.3℃), the water flow rate is excessive. If the water temperature difference exceeds 12°F (6.7℃), then the water flow rate is inadequate.
6. Check the elevation and cleanliness of the condensate line. If the air is too dry for sufficient dehumidification, slowly pour enough water into the condensate pan to ensure proper drainage.
7. If the conditioner does not operate, the following points should be checked:
   a. Is proper voltage being supplied to the machine?
   b. Is the proper type of thermostat being used?
   c. Is the wiring to the thermostat correct?
8. If the conditioner operates but stops after a brief period, check for:
   a. Is there proper airflow? Check for dirty filter, incorrect ductwork.
   b. Is there proper water flow rate within temperature limits? Check water backflush unit if dirt clogged.
9. Check the unit for vibrating refrigerant piping, fan wheels, etc.
10. Do not lubricate the fan motor as it is prelubricated at the factory.

# Maintenance

1. Normal maintenance on all conditioners is generally limited to filter changes. Lubrication of the fan motor is not required.
2. Filter changes are required at regular intervals. The time period between changes will depend upon the project requirements. Some applications such as motels produce a lot of lint from carpeting and linen changes. It is suggested that the filter be checked at 60-day intervals for the first year until experience is acquired. If light cannot be seen through the filter when held up to sunlight or a bright light, it should be changed. A more critical standard may be desirable.
3. The condensate drain pan should be checked annually and cleaned and flushed as required.
4. Recording of performance measurements of volts, amps, and water temperature differences (both heating and cooling) is recommended. A comparison of logged data with start-up and other annual data is useful as an indicator of general equipment condition.
5. Periodic lockouts always are caused by air or water problems. The lockout (shutdown) of the conditioner is a normal protective result. Check for dirt in the water system, water flow rates, water temperatures, airflow rates (may be dirty filter), and air temperatures. If the lockout occurs in the morning following a return from night setback, entering air below machine limits may be the cause.

# Troubleshooting

Should a major problem develop, refer to the following information for possible cause and corrective steps:

### Neither fan nor compressor run

1. The fuse may be blown or the circuit breaker is open. Check electrical circuits and motor windings for shorts or grounds. Investigate for possible overloading. Replace fuse or reset circuit breakers after fault is corrected.
2. Wires may be loose or broken. Replace or tighten.
3. Supply voltage may be too low. Check it with the power company.
4. Control system may be faulty. Check thermostat for correct wiring and check 24-volt transformer for burnout.

### Fan operates but compressor does not

1. Check capacitor.
2. Wires may be loose or broken. Replace or tighten.
3. The high pressure may have tripped due to:
   a) Fouled or plugged condenser ;
   b) Lack of or no condenser water ;
   c) Too warm condenser water ;
   d) Not enough airflow over the coil due to dirty filters;
   e) Coil or fan motor failure.
4. The low temperature switch may have tripped due to:
   a) Fouled or plugged condenser ;
   b) Lack of or no condenser water ;
   c) Too warm condenser water ;
   d) Not enough airflow over the coil due to dirty filters ;
   e) Coil or fan motor failure ;
5. Check thermostat setting, calibration and wiring.
6. The compressor overload protection is open. If the compressor dome is extremely hot, the overload will not reset until cooled down. If the overload is external, replace it. If the overload is internal, replace the compressor.
7. The internal winding of the compressor motor may be grounded to the compressor shell. If so, replace the compressor.
8. The compressor winding may be open. Check continuity with ohmmeter. If the winding is open, replace the compressor.

## Compressor attempts to start but doesn’t

1. Check capacitor.
2. Check for defective compressor by making resistance check on winding.
3. Check run capacitor.

## Compressor runs in short cycle

1. Check thermostat mounting and location.
2. Check all relays, relaying and contacts.
3. Check run capacitor.
4. Check high pressure switch.
5. Check low temperature switch.
6. See if reversing valve has not fully shifted to either side.

## Insufficient cooling or heating

1. Check thermostat for improper location.
2. Airflow may be insufficient. Check and clean the filter.
3. The reversing valve may be defective, creating a bypass of refrigerant. If the unit will heat, check the reversing valve coil.
4. Check capillary tubes for possible restriction of refrigerant flow.
5. Check for restriction in water flow.

## Insufficient water flow through condenser

1. Check to see that valves are open all the way.
2. Check for air in lines.
3. Check circulating pumps.

## Water drips from conditioner

1. Check for plugged condensate drain.
2. Check for dirty filter.
3. Check to see if condensate drain runs uphill.
4. See if blower motor is up to speed.
5. Check for loose or mispositioned blower.
6. Are drains properly trapped?

## Noisy unit operation

1. Check for fan wheel hitting the housing. Adjust for clearance.
2. Check for bent fan wheel. Replace if damaged.
3. Check for loose fan wheel on shaft. Tighten.
4. Make sure compressor is floating free on its isolator mounts.
5. Check for tubing touching compressor other surface. Readjust tubing by bending slightly.
6. Check screws on panels. Tighten.
7. Check for chattering or humming in the contactor relays due to low voltage or a defective holding coil. Replace component.
8. Check water balance to unit for proper water flow rate.

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